

REMARKS/ARGUMENTS

Favorable reconsideration of this application as presently amended and in light of the following discussion is respectfully requested. Claims 1-2, 4-8, 10-12, and 17-23 are presently active in this case, Claim 1 amended, and Claim 9 canceled and Claims 21-23 added by way of the present amendment.

In the outstanding Official Action, Claims 1, 2, 4, 5, 6, 8, 10, 11 and 17-20 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,194,327 to Gonzalez et al. in view of the publication to Park et al.; Claims 1, 7, 9 and 12 were rejected under 35 U.S.C. § 103(a) as being unpatentable over U.S. Patent No. 6,764,967 to Pai et al. in view of Park et al.

Turning now to the merits, in order to expedite issuance of a patent in this case, Applicants have amended independent Claim 1 to clarify the patentable distinctions of the present invention over the cited references. Specifically, Claim 1 as amended recites that “at least one of the etching steps comprises a plasma etch process”. This amendment is supported at least by paragraphs 21 and 26 of Applicants’ specification as originally filed. Therefore, the amendment to Claim 1 does not raise an issue of new matter.

In contrast to the invention of amended Claim 1, none of the cited references disclose a plasma etch process. Specifically, Gonzalez et al. discloses alternating rapid thermal etch and rapid thermal oxidation processes to remove contamination from a silicon wafer. However, this reference explicitly states that the etchant to be used is neither a wet etch process nor a plasma dry etch process, and must be an etchant flowed into a rapid thermal processor.¹ Pai et al. discloses alternating wet etch and wet oxide growth steps wherein the substrate is immersed in a suitable solution for performing the desired etch or growth process. However, Pai et al. does not disclose anything relating to a plasma processing step. Finally,

¹ See Gonzalez et al. at column 3, lines 25-28.

the cited reference to Park et al. merely discloses evaluation of reactive ion etching of substrates using various imaging techniques, and is cited for this teaching to reject only dependent claims. Thus, none of the cited references disclose the etching process now recited in Claim 1, and Claim 1 patentably defines over the cited references.

In addition to the above distinction, Claim 1 also recites monitoring the surface region of the substrate and repeatedly growing an additional ultra thin oxide layer to consume additional defects and etching the additional oxide layer to remove the consumed additional defects based on the monitoring of the surface region. The outstanding Official Action acknowledges that the cited references to Gonzalez et al. and Pai et al. do not disclose this monitoring step, but concludes that it is inherent that there has to be an inspection step to detect the level of contaminants on the substrate in order to continue or stop the growing of the etching steps.² However, it is settled law that “to establish inherency, the extrinsic evidence ‘must make clear’ that the missing descriptive matter is necessarily present in the thing described in the reference, and that it would be so recognized by persons of ordinary skill.”³ The mere fact that a certain thing may result from a given set of circumstances is not sufficient.⁴ While the cited references to Gonzalez et al. and Pai et al. disclose that alternating oxide growth and oxide etch steps are performed to remove contaminants, there is nothing in these cited references to indicate that *in situ* monitoring is performed at the substrate surface in order to determine a stopping point for the alternating processes. For example, the stopping point for the alternating process may be derived from historical data or other process consideration other than actual monitoring of the substrate surface. Therefore, the claimed monitoring step in Claim 1 is not inherent in the cited references. This provides an additional basis for the patentability of Claim 1.

² Official Action at page 3, lines 5-10, and page 4, lines 10-13.

³ In re Robertson, 49 USPQ2d 1949, 1951 (Fed. Cir. 1999).

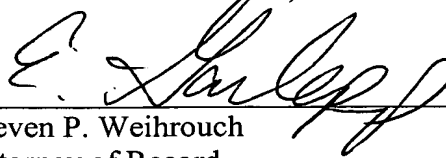
⁴ Continental Can Company v. Monsanto Company, 948 F.2d 1264, 1269, 20 USPQ2d 1746 (Fed. Cir. 1991).

As Claim 1 patentably defines over the cited references as discussed above, Claims 2, 4-8, 10-12 and 17-23, which depend from Claim 1, also patentably define over the cited references. However, Applicants note that these dependent claims provide a further basis of patentability over the cited references. For example, Claims 17-20 include further details of the monitoring step, which was improperly considered inherent in the cited references as discussed above. In addition, Applicants have added new Claim 21 which recites that the substrate comprises Si(x)Ge(y). Both Gonzalez et al. and Pai et al. disclose processing of a semiconductor substrate, exclusively. Thus, neither Gonzalez et al. nor Pai et al. disclose the limitation of new Claim 21. Claims 22 and 23 further specify the plasma processing step which, as discussed above, are not disclosed in the cited references.

Consequently, in view of the present amendment, no further issues are believed to be outstanding in the present application and the present application is believed to be in condition for formal allowance. An early and favorable action is therefore respectfully requested.

Respectfully submitted,

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